

**Food Irradiation**

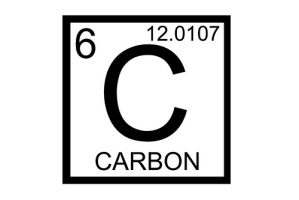
Food irradiation is a technology for controlling spoilage and eliminating food-borne pathogens, such as salmonella. The result is similar to conventional pasteurization and is often called "cold pasteurization" or "irradiation pasteurization." Like pasteurization, irradiation kills bacteria and other pathogens that could otherwise result in spoilage or food poisoning. The fundamental difference between the two methods is the source of the energy they rely on to destroy the microbes. While conventional pasteurization relies on heat, irradiation relies on the energy of ionizing radiation. The FDA emphasizes that no preservation method is a substitute for safe food handling procedures.

* In industrialized countries, the percentage of the population suffering from foodborne diseases each year has been reported to be up to 30%. In the United States of America (USA), for example, around 76 million cases of foodborne diseases, resulting in 325,000 hospitalizations and 5,000 deaths, are estimated to occur each year.
* Food contamination creates an enormous social and economic burden on communities and their health systems. In the USA, diseases caused by the major pathogens alone are estimated to cost up to US $35 billion annually in medical costs and lost productivity.
* Irradiation can be used to prolong the shelf life of fruits and vegetables because it inhibits sprouting and delays ripening.
* Irradiation by gamma rays, X-rays and accelerated electrons under controlled conditions does not make food radioactive. Just as the airport luggage scanner doesn’t make your suitcase radioactive, this process is not capable of inducing radioactivity in any material, including food.
* foods are not changed in nutritional value and they don’t become dangerous as a result of irradiation.
* A big advantage of irradiated food is that it is a cold process: the food is still essentially “raw”, because it hasn’t undergone any thermal process.
* The increase in price for irradiated fruits and vegetables is estimated at 2 to 3 cents per pound. Irradiated poultry and meat products are expected to cost 3 to 5 cents a pound more than non-irradiated meat.

Comparison of Irradiated and Non-irradiated Meat

|  |  |  |  |
| --- | --- | --- | --- |
|  | Day 5 observations | Day 10 Observations | Day 14 Observations |
| Irradiated Meat |  |  |  |
| Non-Irradiated Meat |  |  |  |

Atoms



**Atomic Number**

**Atomic Mass**

Equal to the number of protons in the atom as well as the number of electrons in a neutral atom

Weighted average mass of all the isotopes of an element

**Mass Number** = # of Protons + # of neutrons

**Isotopes** = different forms of the same atom as determined by the number of neutrons in the atom

Isotope Notation

C-14 (14=mass number)

How many protons are there in C-14? \_\_\_\_\_\_ How many neutrons are there in C-14? \_\_\_\_\_

**Determining Atomic Mass**

|  |  |  |
| --- | --- | --- |
|  | Isotope #1 (3 protons, 3neutrons) | Isotope #2 (3 protons, 4 neutrons) |
| 1. Number of each (A) |  |  |
| 1. Abundance of each |  |  |
| 1. Total Mass of each |  |  |
| 1. Average mass of each (C/A) |  |  |
| 1. Weighted mass (B/D) |  |  |
| Atomic Mass (Add E for both isotopes) |  | |

Draw an element cell that contains the atomic number, the symbol and atomic mass of your elements